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(12) UK Patent Application (19) GB (11) 2 214 678 (13) A

(43) Date of A publication 06.09.1989

(21) Application No 8801881.5

(22) Date of filing 29.01.1988

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(51) INT CL⁴
 G06K 19/00, E05B 19/00 47/00, G06K 7/00

(52) UK CL (Edition J)
 G4H HJ H1A
 E2A AEE ALA ALV A113 A116 A136 A137
 G3N NGF N286C
 U1S S1845 S2003 S2185

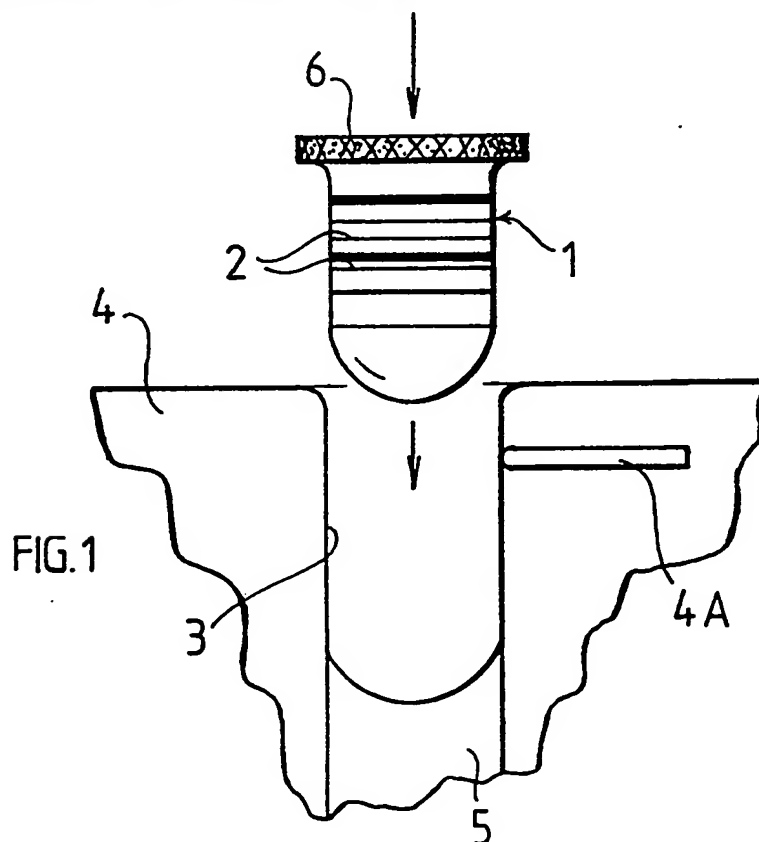
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(58) Field of search
 UK CL (Edition J) A2E AEE ALA ALV ALW, G3N
 NGF NGF2, G4H HJ
 INT CL⁴ E05B, G06K

(54) Valve cap with bar code and reader therefor

(57) A cap 1 for a tyre valve carries a series of rings 2 defining a bar code embodying tyre pressure information. The cap can be inserted into a reader 4 which includes an optical read head 4A. The read code can be used to automatically control the supply of compressed air to the tyre to bring the tyre pressure to the correct figure.

The bar code may instead be carried on the interior of the can or on the tyre valve itself.

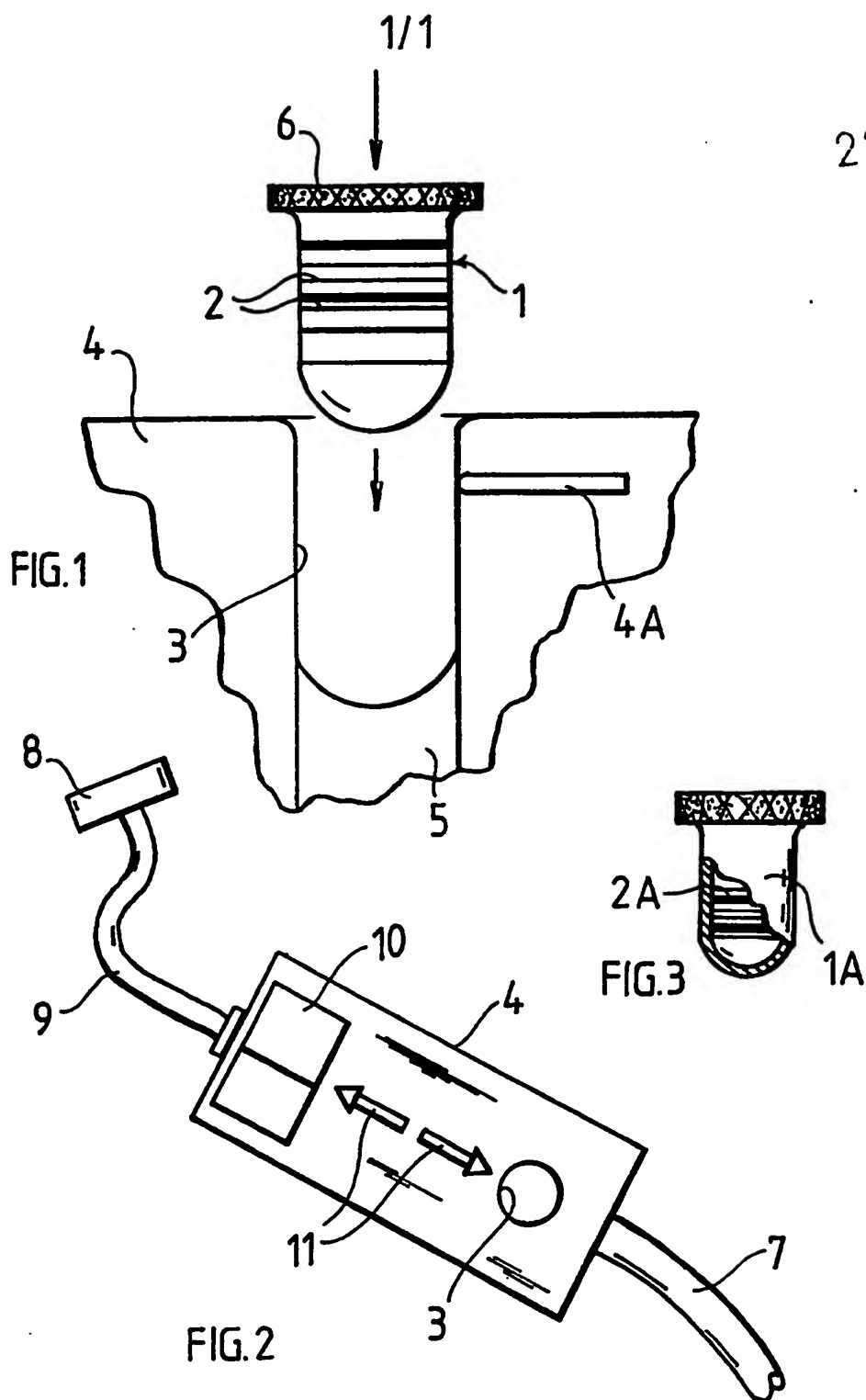


At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1982.

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"Improvements relating to code carrying and reading"

This invention is concerned with devices which are intended to carry codes which will be read by a reader. In a particularly preferred situation it is envisaged that the code will be carried by a cap for a valve for
5 a pneumatic tyre or the like, although there are other instances where the method of mounting the code will be particularly suitable.

Accordingly, from one aspect this invention provides a code carrying device in the form of a body defining
10 a surface of circular cross-section, said surface, in its longitudinal direction incorporating a sequence of machine-readable coded rings.

The great advantage of this arrangement is that the device can be inserted into a reader in any rotational
15 attitude and the code will always be read correctly by a static reading head. In one preferred arrangement the rings will be in the form of a bar code. Furthermore, a code may be readable by a touch sensitive reader or may be optically or magnetically readable. If desired,
20 the device could also carry a visible alphanumeric code or the like.

In one form the device can be formed to incorporate a rod portion carrying the coded rings on its outer face. Such a device could, for example, be used as a key to

release a lock when the correct code is read by a reader.

Another form of the device is as a recessed member having the circular surface on the inner wall of the recess. Alternatively, the device could be in the form of a cap having the code-carrying circular surface on the outer wall thereof. In either instance the device could be constructed in the form of a cap for a valve or other member.

The invention also extends to a reader for reading codes on a device of this invention as hereinbefore defined and having a portion provided with a code-reading head, into or onto which the device is mounted and held whilst being read.

If the device is of the form having coded rings on an outer surface, a recess may be provided in the reader for receipt of the device, the reading head being mounted in the side wall of the recess. Alternatively, if the device is formed with coded rings on an inner surface, then the reader may be provided with a spigot, about which the device will be mounted, the reading head being mounted in a side wall of the spigot.

The reading head portion could incorporate frictional gripping means for holding the device in place. Additionally or alternatively, the reading head portion might incorporate a solenoid which can be

activated to attract a magnetically-attractive portion of the device.

The reader may with advantage incorporate a display panel to display information related to the code read by the reading head. The reader may also incorporate a pump or other means responsive to information embodied in the code and read by the reading head.

The invention may be performed in various ways and preferred embodiments thereof will now be described with reference to the accompanying drawings, in which:-

Figure 1 illustrates a code carrying device constructed in accordance with this invention in the form of a valve cap, together with a portion of a reader to be used in association with the valve cap;

Figure 2 is a plan view of the reader partially illustrated in Figure 1; and

Figure 3 illustrates an alternative form of valve cap constructed in accordance with this invention.

In Figure 1 there is shown a valve cap 1 which is normally screwed onto the head of a valve for a pneumatic tyre. On the outer cylindrical surface of the cap 1 there is provided a series of rings 2 defining a bar code. This valve cap, when removed from the valve, can then be inserted into a recess 3 in a reader 4 (see also Figure 2). A bar code reading head 4A is mounted in the side wall of the recess 3

and will therefore read the coded rings 2 carried by the valve cap 1 as it is inserted, regardless of the rotational attitude of the valve cap. The interior of the recess 3 could be provided with frictional gripping devices such as bristles or a flexible foam layer to hold the valve cap in position, which is particularly useful to ensure that the valve cap does not become lost as other operations are carried out. Additionally or alternatively a solenoid could be provided at the base 5 of the recess 3 to hold the valve cap in position, and in this instance a magnetically attractive portion would be incorporated into the valve cap.

The reading head 4A comprises an optical reader for rings 2 incorporated into the surface of the valve cap 1. It will be appreciated, however, that the reading head could be adapted to read magnetic rings carried by the valve cap 1 or could be a touch sensitive reader which would respond to annular projections on the valve cap 1 defining the rings 2. If desired, the valve cap 1 could incorporate visible coded letters or numerals such as on the ring 6.

The reader 4 illustrated in Figure 2 also acts as a pump control unit for supplying compressed air to a tyre from a compressor via a hose 7 and to a mounting head 8 to be attached to the valve on the

tyre via a further hose 9. It is envisaged that the reader 4 will determine from the bar code rings 2 on the valve cap the pressure required for the tyre from which the valve cap has been removed and will
5 then automatically ensure that the pressure in that tyre is brought to the correct level by selectively operating a two-way valve either to release excess pressure or to cause further pressurised air to be injected. A display panel 10 can provide details of
10 the required pressure as read from the bar code and the status of the pressure within the tyre at any instant. Override switches can be operated, if desired, to inflate or deflate the tyre beyond the normal value and these are associated with a pair of
15 direction arrows 11 on the unit 4.

An alternative form of valve cap is illustrated in Figure 3. Here the bar codes 2A are positioned within the hollow interior of a valve cap 1A. This may be preferred in order to keep the bar code clean
20 and to disguise the fact that the particular valve cap incorporates the bar code so that it will be less prone to being stolen. The reader would then incorporate a spigot incorporating a suitable reading head 4A and the valve cap 1A will be pressed over the
25 spigot to enable reading to take place.

The valve cap may be made of any suitable material

such as metal or plastics. Furthermore, it will be appreciated that the principle of incorporating bar codes on a surface of circular cross-section may be employed in other articles such as coded keys.

- 5 Another possibility is to position the coded rings on the stem of the tyre valve itself. The reading head could then form part of the mounting head 8 on the hose 9.

As an alternative to the proposal of drawing
10 into place and holding in place of the valve cap by means of a solenoid, a negative air pressure could be employed, by connection to a vacuum line.

CLAIMS

1. A code carrying device in the form of a body defining a surface of substantially circular cross-section, said surface, in its axial direction, incorporating a sequence of machine-readable coded rings.
2. A device according to Claim 1, in which the rings are in the form of a bar code.
3. A device according to Claim 2, in which the rings are defined by annular projections on the said surface and are readable by a touch sensitive reader.
4. A device according to Claim 2, in which the rings are optically readable.
5. A device according to Claim 2, in which the rings are magnetically readable.
6. A device according to any preceding Claim which additionally carries a visible alphanumeric or like code.
7. A device according to any preceding claim, which incorporates a rod portion carrying the coded rings on its outer surface.
8. A device according to any of Claims 1 to 6, which comprises a recessed member carrying the coded rings on the inner wall of the recess.

9. A device according to Claim 8, in which the recessed member is in the form of a cap.

10. A device according to any of Claims 1 to 6, which is in the form of a cap carrying the coded rings on its outer surface.

11. A device according to Claim 9 or 10, in which the said cap is the dust cap of a tyre valve.

12. A device according to any of Claims 1 to 8, in the form of a tyre valve.

13. A reader for use with a device according to any of Claims 1 to 12, the reader having a portion into or onto which the said device is mounted to be read and which is provided with a code-reading head.

14. A reader according to Claim 13 for use with a device according to Claim 7 or 10, in which the reader includes a recess for receiving the device, the reading head being mounted in the side wall of the said recess.

15. A reader according to Claim 13 for use with a device according to Claim 8 or 9, in which the reader is provided with a spigot, about which the device is mounted to be read, the reading head being mounted in a side wall of the spigot.

16. A reader according to any of Claims 13 to 15, which incorporates frictional gripping means for holding the device in place whilst being read.

17. A reader according to any of Claims 13 to 16, which incorporates a solenoid which can be activated to attract a magnetically attractive portion of the device to hold the device in place.

18. A reader according to any of Claims 13 to 16, which incorporates means for holding the device in place by negative air pressure.

19. A reader according to any of Claims 13 to 18, incorporating a display panel to display information related to the code read by the reading head.

20. A reader according to any of Claims 13 to 19, which acts as a control unit for supplying compressed air from a compressor to a tyre valve.

21. A reader according to Claim 20, which operates a two-way valve which is arranged to be selectively operated in accordance with tyre pressure information embodied in the code and read by the reading head to ensure that the pressure in that tyre is brought to the correct level by operating the two-way valve to either release excess pressure or to cause further pressurised air to be injected into the tyre.

22. A reader according to Claim 20 or 21, in which the reader is incorporated between a compressor and a mounting head for attachment to the tyre valve.

23. A reader according to Claim 20 or 21 as appended to Claim 12, in which the reader is incorporated in a mounting head for attachment to the tyre valve.

24. A code carrying device substantially as described with reference to the accompanying drawings.

25. A reader substantially as described with reference to the accompanying drawings.

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